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APPLICATIONS FOR GMI SIMULATONS

HINDCAST - MERRA (?) [various issues - emissions, etc.]
- scientific focus on two periods that are interesting separately and could be compared

Application 1 - 2000 - 2007
- huge interannual variability
- changes in emissions in Europe, US, and Asia

data
- Aura, launch to present
- ACE, sondes, AIRS

Application 2 - 1990’s

‘dynamical contribution of to stratospheric ozone trends is negative’

huge changes in the lower stratospheric ozone

(SAGE, ozone sondes)

data

TOMS - MLS

GOME NO2 and formaldehyde

UARS data

(Jonathon Jiang) - would like to be a Co-I on a proposal to using MLS and A-train data to compare with models in the lowermost stratosphere. The goal is to move beyond cataloging differences and find a pathway to improvement.

MLS team has had success working with ECMWF and the cloud-ice scheme, using MLS data to discriminate between several schemes.

Presuming that the UT/LS composition is sensitive to convective transport, progress is possible w/out new simulations by comparisons of :

GMI – GEOS-4 (Aura)

GMI – GEOS-5 (coming) – for same year

GMI – GCM (convection behaves differently in the GCM framework than in the assimilated framework)

CONCEPTS THAT REQUIRE ADDITIONAL SIMULATIONS

(Logan) use Aura data together (MLS CO, OMI NO2, TES CO and O3, tropospheric residual)

address deficiencies in GMI-Aura simulations with sensitivity experiments involving emissions

e.g., Does COMBO underestimate of CO and O3 in the tropics because the emissions are turned off immediately at the end of the biomass burning? Could there be a significant impact of smoldering or is the underestimate due to some other problem either with COMBO or with the emissions?

What is our pathway to improving convective transport and the representation of convection in models?

(also use simulations from the 2000's but also need collaborative energy to actually move beyond comparison and into testing mechanisms).
How would the following work within the embedded GMI framework?

1. Tropics
approach:
examine sensitivity of shape of O_3 profile, CO from AIRS, CO from MLS to convective transport

(there are issues with emissions and potentially a need for higher resolution)

What is our pathway to improving convective transport and the representation of convection in models? (ctd.)

Midlatitudes (Chatfield)

effect of cloud venting and lightning on upper tropospheric composition

are they mixed? are they separated? What is the timescale for re-supply of the UT?

ACE C2, C3 and acetone compounds

mythical PAN data from MIPAS

other observational data sets (DC-8, etc.)

to match NOx data from INTEX-A had to increase the lightning NOx by a factor of four. This made the ozone better. (but if you increase the lightning everywhere in midlatitudes you get too much lightning elsewhere).

Forecasts
impact of emission reductions on sulfur (Dale Allen)
what is now a summertime problem for pollution (O3) may become a wintertime problem for particulate matter (PM) (the standard for acceptable has been lowered from 65 to 35)

data
MISR and MODIS (talk to the aerosol working group)

Bob Chatfield - what is the best way to get at 1-3 km ozone? what can be offered from a model or from ozone assimilation? what is the best way to define boundary conditions for air quality forecasts.